

**REMARKS**

The Office Action mailed July 8, 2003, has been received and reviewed.

In the specification, the paragraph beginning at page 22, line 12 has been modified to add words describing an element supported by the claims and drawings. Also, a paragraph has been added before the paragraph beginning at page 12, line 8 to clarify the generation of moisture maps supported by other areas of the specification.

Annotated Drawings showing minor changes are attached. Additionally, Formal Drawings incorporating the changes are also attached.

Claims 1 through 62 are currently pending in the application. Claims 1 through 62 stand rejected. Claims 10 and 33 have been canceled. Applicants have amended claims 1, 11, 12, 20, 28, 30-32, 34, 42, 47, 53, and 56-62, and respectfully request reconsideration of the application as amended herein. Claims 1, 20, 30, 32, 47, and 53 have been amended to clarify some elements in response to the Examiner's observations. The other claim amendments are due to dependencies upon the previously mentioned claims or to correct phrasing of some claims.

In an effort to make the remarks more understandable, Applicants have used item numbering, where appropriate, coinciding with paragraph numbering used in the Office Action. As a result, the numbering begins with item 2 and skips item numbers where a remark is not necessary.

**35 U.S.C. § 112 Claim Rejections**

2. Claims 42 and 55 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 42, the Office Action states that the specification does not clearly indicate, "how a **moisture map** of the zone of interest would be derived by knowing the corresponding value of the moisture content." Therefore, for examination purpose, examiner treats this limitation (moisture map) as moisture content in the soil."

While not explicitly described in the specification, “moisture map” is a term of art used in the agricultural industry to indicate a geographic/spatial map indicating moisture content at various spatial locations. This term and its meaning would be generally known, at the time the invention was made, to a person of ordinary skill in the arts dealing with agriculture and optimal farming methodologies. This is clear from a review of web sites devoted to agriculture. More specifically, the United States Department of Agriculture (USDA) web site ([www.usda.gov](http://www.usda.gov)), contains numerous examples of moisture maps, some of which predate the filing date of this application by more than three years. The most typical applications of moisture maps are for crop moisture content and soil moisture content.

The present application, including claim 42, is directed toward generating soil moisture maps based on spatial placement of the probes. Again, the specification does not explicitly describe determining spatial location of the various probes. However, prior knowledge of the spatial location of the various probes is easily implied from the many text references within the specification. For example, from the specification, “it will be appreciated that, due to changing environmental, soil, and crop conditions, the moisture content of an agricultural field may vary greatly with the passage of time and **according to different locations in the field.**” (page 5, lines 1-3) This is followed by, “The soil moisture sensor should be able to process **the collected moisture content data to generate a moisture map.**” (page 5, lines 11-12). From these statements, it is implicit that knowledge of sensor location at **different locations in the field** is available for use in generating moisture content maps based on those different locations.

Further, in the detailed description of a specific embodiment, the application states, “soil moisture sensor 100 comprises a reader 200 and at least one probe 300. In a preferred embodiment, a **plurality of probes 300 are disposed throughout** agricultural field 400, or other zone of interest, so as to be in contact with soil 402.” (page 12, lines 2-4) The specification then goes on to state, “The moisture content data thus acquired may be employed to facilitate real-time control of a field irrigation system, wherein the **amount of water dispensed on various parts of agricultural field 400**, as well as the time(s) at which the water is dispensed, are determined with reference to the moisture content data. Alternatively, the moisture content data may be used to generate a moisture map of agricultural field 400.” (page 13, lines 4-9) Again it is

clear that to be able to modify the amount of water dispersed on various parts of the agricultural field, the system described must have knowledge of the locations of the plurality of probes disposed throughout. This location data is gained at the time the probes are placed. The reader 200 and/or remote site 600 retain the location data for further processing to develop the moisture map when moisture measurements are collected.

Regarding claim 55, the Office Action states that “the specification does not provide support for this claimed limitation as to how said probe can be transported since said probe is implanted into the soil.” Applicants respectfully submit that moving the probe in relationship to the reader is supported by the specification on page 37, lines 16-22 of the present application. Additionally, it is supported by a specific example described on page 36, lines 16-21. This specific example describes the medium of interest as a process fluid. This process fluid could easily be considered to be a medium such as a soil slurry.

By way of another example, a greenhouse might be used to give the examiner another idea of how this might work. Potted plants within a green house may contain a moisture sensing probe. These plants may be on a conveyor belt or other transportation means to move the plants between different zones, such as zones, for water, fertilizer, and sun exposure. In this scenario, the reader could be in a stationary location and communicate with the probes as the probes passed by the stationary location.

4. Claims 28 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Particularly, there is insufficient antecedent basis for the element, “said at least one remote site.” Applicants have amended dependent claim 28 to be dependent upon claim 27, containing the referenced element, rather than dependent upon claim 20.

### **35 U.S.C. § 102(b) Anticipation Rejections**

#### Anticipation Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al.

6. Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Schuermann et al. (U.S. Patent No. 5,053,774). Applicants respectfully traverse this rejection, as hereinafter set

forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Applicants have amended claim 1 to redefine the element of; “at least one probe in communication with at least one **medium of interest**” to “at least probe in communication with at least one **soil medium**.” Also, claim 1 has been amended to modify the element of “measure at least one parameter” to “measure at least one **moisture** parameter.” The Office Action explicitly states in its rejection of claims 6, 10-12, 16, 17, 30, 33, and 41, that Schuermann “does not specifically teach measuring the moisture content of soil.” Therefore, with its amendment, claim 1 is not anticipated by Schuermann because each and every element as set forth in amended claim 1 is not described either expressly or inherently in Schuermann. Namely, the element of measuring at least one moisture parameter is missing. As a result, amended claim 1 would now likely fall under the Office Action’s §103(a) obviousness rejection similar to that of claims 6, 10-12, 16, 17, 30, 33, and 41. Therefore, amended claim 1 is further discussed in that section below.

### 35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch

8. Claims 2 through 4, 6 through 8, 10 through 33, 41 through 43, 46, and 53 through 61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must

be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Regarding claim 6, 16, and 41, the Office Action refers to measuring the moisture content of soil as missing from Schuermann but taught by Hirsch. However, claim 6 addresses a system wherein "said at least one excitation signal comprises radio frequency energy." Claim 16 addresses a system wherein "at least one excitation signal is selectively transmitted. Finally, claim 41 addresses a probe wherein a circuit "demodulates a data component of said excitation signal so as to extract at least one instruction." There is no mention of soil moisture content in claims 6, 16, and 41. As a result, Applicants respectfully request clarification as to the basis for a §103(a) obviousness rejection with respect to these claims.

Regarding claims 10-12, 17, 30, and 33, as cited by the Office Action, as well as amended claim 1 as discussed above, Applicants respectfully traverse this rejection. For a proper §103(a) rejection, the prior references when combined must teach or suggest all the claim limitations. Additionally, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on Applicants' disclosure.

The Office Action states that "Schuermann does not specifically teach measuring the moisture content of soil." However, "Hirsch teaches a probe for use in conjunction with a reader to facilitate measurement of moisture content of soil," and "said probe uses solar energy as a power source." The Office action then states that it would be obvious to alternatively use a moisture probe in the Schuermann reader and obvious to provide an excitation signal as an alternative source to the solar energy.

As to the moisture probe, Schuermann suggests many applications for transponder units, however moisture content sensors are not a suggested application (col. 1, lines 24-45). Hirsch, disclosing moisture content sensors, predates Schuermann and was therefore available as a possible combination with the Schuermann invention at the time Schuermann was made. Yet,

the suggestion to modify Schuermann for an application including moisture content sensors was not among the list of many possible applications and must not, therefore, have been obvious at the time of Schuermann. Additionally, the Office Action states nothing to suggest that the combination became more obvious at any time prior to the time at which the present invention was made.

As to the power source, Hirsch teaches a solar panel as a power source for the probe and states, "[p]ower developed at the solar panel 33 is . . . used to charge a rechargeable battery 36. The system typically provides power without wires, and allows power availability during times without sunlight." (col. 4, lines 1-5). Hirsch does not teach any alternative power means except in the negative to say power is typically provided without wires. The teaching or suggestion to make the claimed combination must be found in the prior art. Here there is no suggestion to use any alternative means let alone a means for developing the power from a source not connected to the probe. Therefore, since it is not suggested, and the power development is accomplished in a significantly different manner, it would not have been obvious to a person of ordinary skill in the art to use the inductive coupling means in place of a solar panel.

Additionally, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Hirsch implies that sensor station power must be active at the time commands are received and moisture content is measured (col. 4, lines 8-12). In the present invention, the excitation signal, which may contain commands, provides the power by way of inductive coupling during transmission of the excitation signal. Hirsch would not be able to recognize the commands generated unless power, through the solar cell or battery, was present prior to the time of the excitation/command signal.

Finally, note that because the elements of claim 10 are incorporated in amended claim 1, claim 10 is canceled. Similarly, claim 33 is cancelled. For the reasons stated above, amended claims 1, 11, 12, and 30, as well as claim 17, are clearly allowable over the cited prior art of Schuermann in view of Hirsch under 35 U.S.C. § 103. As a result, Applicants respectfully request that the rejections of claims 1, 11, 12, 17, and 30 be withdrawn.

Regarding claim 27, the Office Action states Schuermann in view of Olson teach a system as claimed in claim 27 except for; "said reader further comprises a data link, said data link facilitating download of data obtained from said data signal to at least one remote site." Applicants note that claim 27 is dependent upon independent claim 20 and the element asserted to be missing by the Office Action is the only new element added to independent claim 20 by dependent claim 27. Applicants respectfully disagree with the Office Action position that Schuermann in view of Olson teaches all the elements in claim 20, and therefore by dependency claim 27. The reasoning for this position is explained below in the section dealing with the rejection of claim 20. As a result, claim 27 is allowable because it is dependent on now allowable claim 20. Therefore, Applicants respectfully request that the rejection of claim 27 be withdrawn.

Regarding claim 28, claim 28 is dependent on now allowable claim 27 and is therefore allowable. As a result, Applicants respectfully request that the rejection of claim 28 be withdrawn.

Regarding claim 31, the Office Action states, "[e]ven though Schuermann et al. does not specifically suggest that said data signal having a frequency different that that of said excitation signal, however, it would have been obvious . . . that using different frequencies for said data signal and said excitation signal would avoid interference." Applicants respectfully submit that it would not be obvious, in fact this capability is not possible in Schuermann, and Schuermann teaches away from using different frequencies. As stated in col. 7, lines 7-25, Schuermann teaches that;

"the coil 38 acts as transmitting coil which transmits the RF carrier wave as RF interrogation pulse for a duration defined by the duration of the signal . . . **After expiry of this duration defined by the microprocessor 18 operation of the RF generator 20 ends (instant t3). To ensure that the oscillation in the resonant circuit formed by the coil 38 and the capacitor 40 dies away aperiodically as quickly as possible the switch 42 is briefly opened . . . After again closing switch 42 the switch 46 is opened (instant t4) and as a result the resonant circuit comprising the coil 38 and the capacitor 40 is switched over to a series**

**resonant circuit and is ready to receive a reply from the responder unit 12.”**

It is clear that Schuermann teaches using a single resonant circuit for both transmission and reception in the interrogation unit. Additionally, Schuermann provides circuitry to ensure that transmission oscillations die out so as not to interfere with detection of a reply from the responder unit. Using a single resonant circuit and at different temporal points for transmission and reception clearly teaches away from “said data signal having a frequency substantially different than that of said excitation signal.” For this reason, claim 31 is allowable over the cited prior art of Schuermann in view of Hirsch under 35 U.S.C. § 103, and Applicants respectfully request that the rejection of claim 31 be withdrawn.

Regarding claim 32, the Office Action indicates that Schuermann teaches said data signal having the same resonant frequency as the resonant frequency of said electronic circuit. Applicants have amended claim 32, to include the limitations of claim 33 such that the resonant frequency of the electronic circuit is dependent on the moisture sensing capacitor. This is clearly different from Schuermann, where the resonant frequency is at a specific value determined by fixed value elements. For this reason, claim 32 is allowable over the cited prior art of Schuermann in view of Hirsch under 35 U.S.C. § 103 and Applicants respectfully request that the rejection of claim 32 be withdrawn.

Regarding claims 42, 54, and 55, the Office Action states that these claims are rejected for the same reasons as claim 30. Claim 30 is discussed above. Since claim 30 is now allowable, claims 42, 54, and 55 should be allowable for the same reasons. As a result, Applicants respectfully request that the rejections of claims 42, 54, and 55 be withdrawn.

Regarding claims 29 and 58, these claims are dependent on now allowable claims 20 and 53 respectively as discussed below. As a result, Applicants respectfully request that the rejections of claims 29 and 58 be withdrawn.



Finally, Applicants note that while claims, 2-4, 7, 8, 13-15, 18-26, 43, 46, 53, 56, 57, 59, 60, and 61, were called out by the Office Action as rejected under this section of the Office Action, they were not. They were however described under item 9 below. As a result, Applicants are assuming for the purpose of these remarks that the claims cited in this paragraph are covered by item 9 and, as a result, rejected based upon Schuermann, in view of Hirsch, and in further view of Olson.

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch and in further view of U.S. Patent No. 5,337,957 to Olson

9. Claims 19, 20, 53, 56, 57, 59 and 61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149) and in further view of Olson (U.S. Patent No. 5,337,957). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claims 19, 20, 53, 56, 57, 59, and 61, the Office Action states that Schuermann in view of Hirsch does not teach, "sending a control signal to the object system to cause a corresponding response by the object system."

Applicants have amended independent claims 20 and 53 to clarify the derivation of power in the sensor through inductive coupling and the use of the probe in a soil medium. Referring to the arguments developed under item 8, Applicant's assert that amended independent claims 20 and 53 are not obvious in light of Schuermann in view of Hirsch under §103(a). Specifically, the moisture content sensor from Hirsch, used in the transponder arrangement of Schuermann is not obvious because there is no teaching or suggestion to combine the two elements. Additionally, neither Schuermann, nor Hirsch teach or suggest the combination of using a remote inductively coupled power source for the probe. As explained earlier in more detail, since it is not suggested, and the power development is accomplished in a significantly different manner, it would not have been obvious to a person of ordinary skill in the art to use the inductive coupling means in place of a solar panel.

Therefore, amended independent claims 20 and 53 are not obvious due to the combination of Schuermann and Hirsch regardless of whether Olson teaches the additional

element of sending a control signal to the object system. As a result, claims 20 and 53 are now allowable and Applicants respectfully request that the rejections of claims 20 and 53 be withdrawn.

The Office Action contains a single declaratory statement with no period near the middle of page 7 stating, "Claims 20 and 53 are rejected for the same reasons as claim 30." Applicants have already addressed claims 20 and 53 immediately above, and claim 30 under section 8. There are numerous difference between claim 30 and the cited claims 20 and 53. For this reason, and because all three claims have been addressed previously, Applicants have not responded directly to this statement believing it to possibly be a "cut and paste" error. Please advise Applicants if they are incorrect, and if so, please provide an explanation as to why claims 20 and 53 should be rejected for the same reasons as claim 30.

Regarding claims 18, 21-23. Claim 18 is dependent on the now allowable amended claim 1. Claims 21-23 are dependent on the now allowable amended claim 20. As a result, these claims are now allowable and Applicants respectfully request that the rejections of claims 18, and 21-23 be withdrawn.

We now turn to claims 13-15, 24-26 and 46. Claims 13-15 are dependent on the now allowable amended claim 1. Claims 24-26 are dependent on the now allowable amended claim 20. Claim 46 is dependent on the now allowable claim 42. As a result, these claims are now allowable and Applicants respectfully request that the rejections of claims 13-15, 24-26 and 46 be withdrawn.

We turn now to claims 2, 4, 43 and 60. Claims 2 and 4 are dependent on the now allowable amended claim 1. Claim 43 is dependent on the now allowable claim 42. Claim 60 is dependent on the now allowable amended claim 53. As a result, these claims are now allowable and Applicants respectfully request that the rejections of claims 2, 4, 43 and 60 be withdrawn.

Regarding claim 3, it is dependent on the now allowable amended claim 1. As a result, it is now allowable and Applicants respectfully request that the rejection of claim 3 be withdrawn.

Regarding claim 7, it is dependent on the now allowable amended claim 1. Additionally, claim 7 is rejected for the same reasons as claim 31. Claim 31 is now allowable under the analysis shown above under section 8. As a result, claim 31 is now allowable and Applicants respectfully request that the rejection of claim 7 be withdrawn.

Regarding claim 8, it is dependent on the now allowable amended claim 1. As a result it is now allowable and Applicants respectfully request that the rejection of claim 8 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch and in further view of U.S. Patent No. 4,903,031 to Yamada

10. Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149) and in further view of Yamada (U.S. Patent No. 4,903,031). Applicants respectfully traverse this rejection, as hereinafter set forth. The Office Action states that Yamada "teaches a transmission system, which includes circuitry for blocking certain receivers from receiving transmitted signals." This is different, however, from what is claimed in claims 9 as "said reader comprising blocking circuitry, said blocking circuitry substantially preventing said at least one excitation **signal transmitted by said reader from being received by said reader.**" In other words, the receiver is blocking receipt of the signal transmitted by itself.

In Yamada, "the switch 7 is arranged between the demodulator 6, and a television (TV) receiver 8 and serves to selectively disconnect the video signal and the audio signal." Yamada appears to be a one way system where the transmission of a signal between a demodulator and a TV may be disconnected. Applicants can find nothing in Yamada referring to blocking the transmitted signal from being received back at the receiver. In other words, Yamada prevents a signal from being transmitted, whereas the present invention prevents a signal, albeit the same signal that was transmitted, from being received. Therefore, this element is not taught or

suggested by the combination of Schuermann, in view of Hirsch and in further view of Yamada.

Additionally, claim 9 is dependent on the now allowable amended claim 1. For these reasons, claim 9 is now allowable and Applicants respectfully request that the rejection of claim 9 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch and in further view of U.S. Patent No. 5,927,603 to McNabb

11. Claims 45, 47, 49, and 50 through 52 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149) and in further view of McNabb (U.S. Patent No. 5,927,603). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 45, this claim is dependent on the now allowable amended claim 42. As a result it is now allowable and Applicants respectfully request that the rejection of claim 45 be withdrawn

Regarding claim 47. The Office Action states that claim 47 is rejected for the same reasons as claims 42 and 45. Further, Claim 42 is rejected for the same reason as claim 30. Claim 30 is now allowable as described in the remarks under section 8. Claim 45 is dependent on the now allowable amended claim 42. As a result, because the now allowable amended claims 30 and 42 are the sources for the rejection of claim 47, claim 47 is now allowable. More specifically, the combination of Schuermann in view of Hirsch does not teach or suggest the elements of “a plurality of **probes for measuring moisture content** in operative communication with the agricultural field; a reader, said reader transmitting an excitation signal to said plurality of probes, an energy component of said excitation signal causing each probe that receives said **excitation signal** to determine moisture content of soil proximate to said each probe, respectively, and said energy component causing said each probe to **generate transitory electromagnetic energy sufficient to provide power for said each probe and transmit a data signal corresponding to said moisture content** to said reader.”

The Office Action goes on to explain that McNabb teaches the element of "a mobile irrigation structure having a plurality of nozzles attached thereto, said plurality of nozzles being in fluid communication with a water source, and said mobile irrigation structure transporting said reader throughout the agricultural field so as to facilitate operative communication between said reader and said plurality of probes." However, since there are already elements missing in the combination of Schuermann in view of Hirsch and applicants cannot find this same combination in McNabb, all the elements have not been taught or suggested as required for a proper § 103(a) rejection. 2

For these reasons, claim 47 is allowable over the cited prior art of Schuermann in view of Hirsch and in further view of McNabb under 35 U.S.C. § 103. As a result, Applicants respectfully request that the rejections to claim 47 be withdrawn.

Regarding claims 49, and 51, Applicants can find no specific reference in the Office Action as to why these claims are rejected. In any event, claims 49 and 51 are dependent on now allowable claim 47. As a result, Applicants respectfully request that the rejections to claims 49 and 51 be withdrawn.

Regarding claims 50 and 52. These claims are dependent on now allowable amended claim 47 and Applicants respectfully request that the rejections to claims 50 and 52 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch and in further view of U.S. Patent No. 5,927,603 to McNabb and U.S. Patent No. 4,662,563 to Wolfe, Jr.

12. Claim 48 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149) and in further view of McNabb (U.S. Patent No. 5,927,603) and Wolfe, Jr. (U.S. Patent No. 4,662,563). Applicants respectfully traverse this rejection, as hereinafter set forth. Claim 48 is dependent on now allowable amended claim 47 and is therefore allowable. As a result,

Applicants respectfully request that the rejections to claim 48 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 5,053,774 to Schuermann et al. in view of U.S. Patent No. 4,396,149 to Hirsch and in further view of U.S. Patent No. 4,683,904 to Iltis

13. Claims 5, 34 through 40, 44 and 62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schuermann et al. (U.S. Patent No. 5,053,774) in view of Hirsch (U.S. Patent No. 4,396,149) and in further view of Iltis (U.S. Patent No. 4,683,904). Applicants respectfully traverse this rejection, as hereinafter set forth.

We first address claim 34. This claim has been amended by Applicants to emphasize that, using the elements of this claim, the resonant frequency is developed by the combination of the "capacitance of said moisture sensing capacitor operably coupled to said inductive loop." This is different than Iltis wherein the "relaxation oscillator 18 comprises unijunction transistor 12, the basic or dry soil frequency being governed by capacitor 19 coupled between emitter 20 and ground, while base 23 is connected to ground through resistor 23. The capacitance which determines the operating frequency of oscillator 18 at any particular time is a combination of plates 12 and 14 buried in the soil, and capacitor 19." (col. 3, line 65 to col. 4, line 4) The Iltis oscillator therefore uses the passive components of capacitance and resistance in combination with an active element (transistor 12) to produce the oscillating frequency. On the other hand, the present invention generates a resonant frequency using only the passive elements of the moisture sensing capacitor and the inductive loop. This is particularly significant in that the inductive loop serves the additional purpose of providing the energy for the oscillating circuit from receipt of the excitation signal. Applicants can find nothing in Iltis, Schuermann, or Hirsch that teaches or suggests this combination. As a result, each and every element is not taught or suggested as required for a §103(a) rejection.

In addition, claim 34 is dependent upon now allowable amended claim 30 and is therefore allowable independent of the above argument for non-obviousness. For these reasons, Applicants respectfully request that the rejection of claim 34 be withdrawn.

Regarding claim 39, this claim is dependent on now allowable amended claim 30 and is

therefore allowable. As a result, Applicants respectfully request that the rejection of claim 39 be withdrawn.

Regarding claim 5, this claim is dependent on now allowable amended claim 1 and is therefore allowable. As a result, Applicants respectfully request that the rejection of claim 5 be withdrawn.

We now turn to claims 35-38, 40, and 44. Claims 35-38 and 40 are dependent on the now allowable amended claim 30. Claim 44 is dependent on the now allowable claim 42. As a result, these claims are now allowable and Applicants respectfully request that the rejections of claims 35-38, 40 and 44 be withdrawn.

Regarding claim 62, the Office Action states that claim 62 is rejected for the same reasons as claims 30 and 34. Applicants reiterate their argument concerning claim 30. More specifically, the combination of Schuermann in view of Hirsh does not teach or suggest the elements of **“a plurality of probes, each of said plurality of probes having an electronic circuit with a moisture sensing capacitor in operative communication with the soil,”** and **“said reader and respective tuned circuit transmit/receive antennae of said plurality of probes so as to facilitate establishment of an inductive couple between said reader and said plurality of probes, an energy component of said digital excitation signal energizing at least a portion of each of respective said electronic circuits.”** As a result, all the elements have not been taught or suggested as required for a proper § 103(a) rejection. Therefore, Applicants respectfully request that the rejections of claim 62 be withdrawn.

### ENTRY OF AMENDMENTS

The amendments to the specification, drawings and claims 1, 11, 12, 20, 28, 30-32, 34, 42, 47, 53, and 56-62 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

### CONCLUSION

Claims 1-9, 11-32, and 34-62 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



Stephen R. Christian  
Registration No. 32,687  
Attorney for Applicants  
P.O. Box 1625  
Idaho Falls, ID 83415-3899  
Phone: (208) 526-9140  
Fax: (208) 526-8339

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Attachments: Annotated Sheet Showing Changes (1 sheet, 1 figure)  
Formal Drawings (11 sheets, 11 figures)



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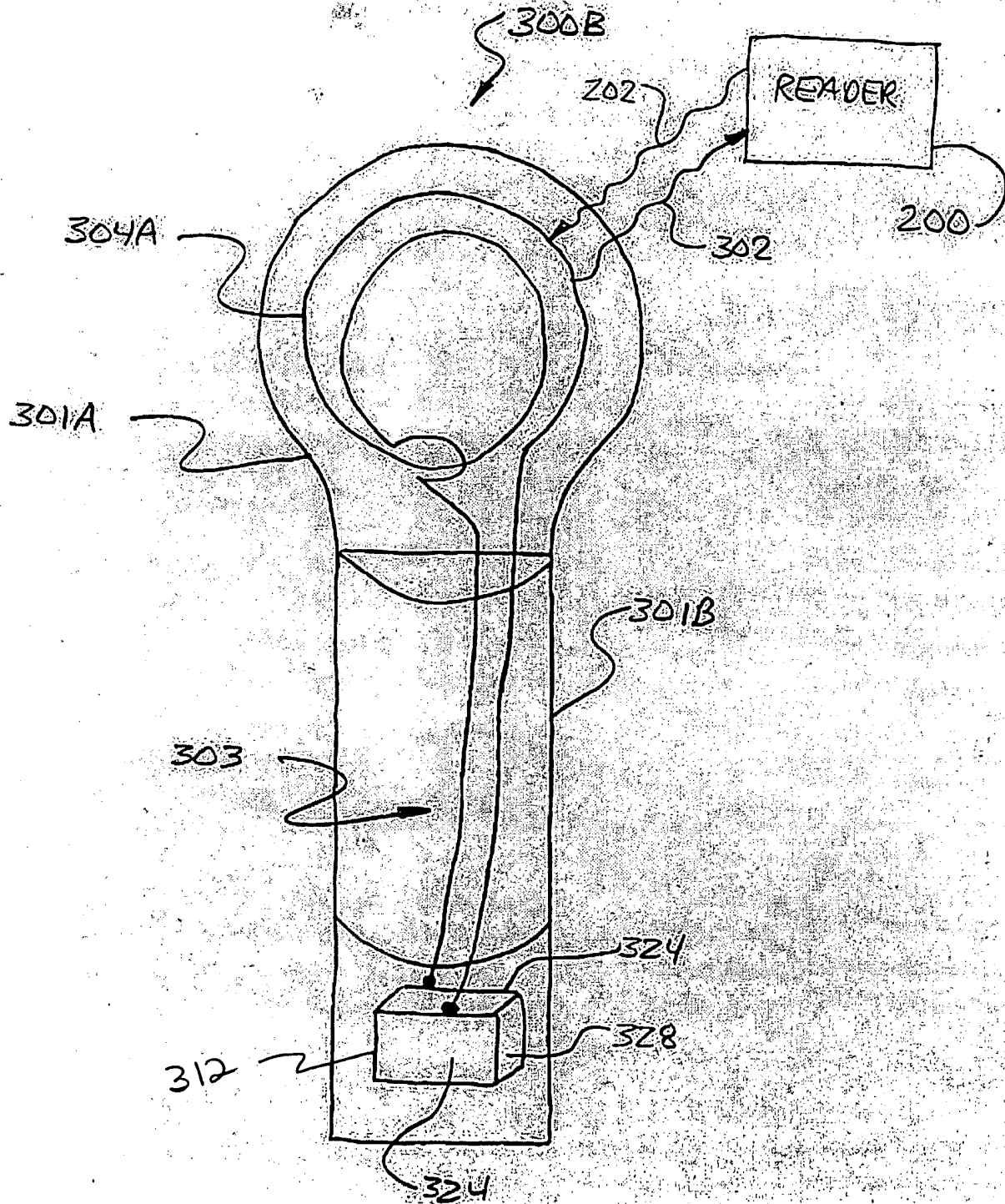


FIGURE 2C

APPROVED

12/21/03

HP